Zarinetchi's device which the Examiner seeks to justify by arguing "predictable results", and claims 19 and 9 over Zarinetchi in view of Winkler (U.S.Patent No. 5, 527,348). The Examiner's rejections are respectfully traversed.

For a claimed invention to be obvious over a combination of prior art references, the Examiner must demonstrate a reason as to why one of ordinary skill in the art would have combined the cited references, as argued by the Examiner, to produce the claimed invention. Here, even assuming, *arguendo*, that the Examiner properly combined the cited references, the resulting combination would still not produce the claimed invention for the reasons set forth below.

Claims 1, 10, 11, 20 and 21 are the independent claims pending in the present application. Apparatus claim 1 of the present invention is directed to a transmission device for transmitting an alternating magnetic field to a receiver, which is implantable in a human or animal body. Apparatus claims 10 and 11 of the present invention are each directed to an apparatus for transferring wireless energy from outside a human or animal body into the body. Method claims 20 and 21 of the present invention are each directed to a method for transferring wireless energy from outside a human or animal body into the body.

Each of claims 1, 10, 20 and 21 recites a coil for generating an alternating magnetic field outside of a human or animal body. Claim 11 recites first and second coils for generating respective magnetic fields.

Each of claims 1, 10, 11 and 21 describes the coil(s) as extending longitudinally between a front end that is directed toward a receiver implantable in the human or animal body and a rear end that is directed away from the receiver. Claim 20 describes the coil as extending longitudinally between a front end directed away from a hand holding a transmission device including the coil and a rear end facing the hand holding the transmission device, with the transmission device transmitting the alternating magnetic field to the implanted receiver.

Each of claims 1, 10, 11 and 21 describes a shield that surrounds the coil, except the front end of the coil so that the alternating magnetic field is transmitted towards the receiver. Claim 20 describes a shield that surrounds the rear and circumference of the coil along at least a portion of the longitudinal extension of the coil . Finally, all of these claims describe a magnetizable core that is part of the shield and that extends inside the coil.

Zarinetchi, the primary reference cited by the Examiner in his §103(a) rejections of the claims pending in the present application, fails to disclose at least two elements recited in independent claims 1, 10, 11, 20 and 21 of the present application, *i.e.*, (1) a shield surrounding a coil extending longitudinally *vis-à-vis* a human or animal body, and (2) a magnetizable core extending inside of the longitudinally extending coil, as described in independent claims 1, 10, 11, 20 and 21 of the present application.

Zarinetchi discloses a transcutaneous energy transfer ("TET") device that is described as being provided with a magnetic shield for the primary winding of the device

to reduce sensitivity of the device to conducting objects in the vicinity of the device's coils and to increase the percentage of the magnetic field generated by the primary coil that reaches a secondary coil implanted in a patient. Figure 1 of Zarinetchi shows a side cutaway view of a TET coil pair including a primary coil 10 magnetically shielded by a shield 16 and a secondary coil 12 implanted in a patient. Figures 2-5 of Zarinetchi show various embodiments of the shield 16 shown in Figure 1 of Zarinetchi. Zarinetchi, col. 2, lns. 49-57.

Figure 1 of Zarinetchi shows primary coil 10 as having a diameter "d" and implanted secondary coil 12 as having a smaller diameter "d_2" for transferring energy through a skin boundary 14. Zarinetchi, col. 2, lns. 61-64. The device shown in Figure 1 of Zarinetchi shows the primary coil 10 being mounted on magnetic shield 16. Zarinetchi describes the shield 16 as having a shape that is substantially the same as that of the primary coil 10 and a diameter "D" that is greater than the diameter "d" of the primary coil 10 by an amount that is equal to twice the thickness "t" of the shield 16 for purposes of shielding the magnetic field generated by the primary coil 10. Zarinetchi, col. 3, lns. 20-34.

Thus, it is clear from Zarinetchi's description of his transcutaneous energy transfer device that such device does not describe a shield surrounding a longitudinally extending coil, as described in independent claims 1, 10, 11, 20 and 21 of the present application. As can readily be seen in Figure 1 of Zarinetchi, Zarinetchi's shield 16 covers only the back face of the primary coil 10, and, thus, does not surround any part of the

longitudinally extending circumference of the coil 10 so that only the front end of the coil 10 is exposed, as described in the independent claims of the present application.

Zarinetchi also does not, as acknowledged by the Examiner, disclose a magnetizable core that is part of such a shield and that extends inside of a longitudinally extending coil, as described in the independent claims of the present application. The Examiner seeks to compensate for this deficiency in the teachings of Zarinetchi by looking to Chen as disclosing a transmission coil with the magnetizable core recited in the independent claims of the present application.

With regard to the Examiner's rejection of claims 1-4, 6, 8, 10, 12-14, 16, 18, 20 and 21 under §103(a) over Zarinetchi and Chen, Figure 1 of Chen shows a first embodiment of a device for conveying power transcutaneously to a medical device implanted within a body of a patient. The device of Figure 1 of Chen, which is the device referenced by the Examiner through his citation of lines 64-66 in column 4 of Chen, includes a transmitter coil 20 that is electromagnetically coupled to an implanted receiver coil 22 so as to convey power transcutaneously through an intervening cutaneous layer 24. As can be seen in Figure 1, the core 28 of the transmitter coil 20, and the transmitter coil 20 itself, are oriented substantially laterally, not longitudinally, to the intervening cutaneous layer 24 and the implanted coil 22. In addition, the core 28 of transmitter coil 20 is not part of a shield that surrounds the transmitter coil 20. This arrangement is different from the shielded coil arrangement described in the independent claims of the present application in which the transmitter coil extends longitudinally with a front end

directed toward a receiver implanted in a patient and a rear end directed away from the receiver and with the longitudinally extending circumference of the coil being surrounded by a shield with a magnetizable core extending inside of the coil. Thus, Chen does not compensate for the deficiencies in the teachings of Zarinetchi, so as to render the independent claims of the present application obvious over a combination of Zarinetchi and Chen.

Given that independent claims 1, 10, 11, 20 and 21 are not obvious over the combination of Zarinetchi and Chen, it is clear that dependent claims 2-9 and 12-19, which depend either directly or indirectly form such claims are also not obvious over the combination of Zarinetchi and Chen.

With regard, specifically, to the Examiner's rejection of claims 5, 7, 11, 15 and 17 under §103(a) over Zarinetchi alone, based on modifications of Zarinetchi's device justified by the Examiner by arguing "predictable results", it is not appropriate for an examiner to use his or her own understanding or experience of what would be basic knowledge when making factual findings for a patentability determination of a claimed invention. Rather, the Examiner must rely on "concrete factual evidence" to support a determination that the claims are not patentable because they are obviousness over cited prior art. *In re Zurko*, 258 F.3d 1379, 1385-86 (Fed. Cir. 2001). The same is true with respect to the Examiner's rejection of claims 5, 7, 11, 15 and 17 under §103(a) over a combination of Zarinetchi and "predictable results".

With regard, specifically, to the Examiner's rejection of claims 9 and 19 under §103(a) over Zarinetchi and Winkler, as explained in the prior Amendment After Final Rejection filed on April 7, 2008, Winkler discloses an apparatus for providing electrical field (E-field) shielding for electro-magnetic devices. The embodiment of the device shown in Figure 2 of Winkler is a programming head 100 from an implantable medical device programming system housed within a nonconductive exoskeleton. Exoskeleton 102/104 of programming head 100 is a wire coil antenna. This exoskeleton is comprised of top and bottom portions 102 and 104, respectively, and an internal retainer element 106, each of which are preferably made of molded plastic, ABS, or the like. Within the assembly 108 comprising one or more wires 110 coiled multiple times around a rigid spool 112. The wire coil antenna assembly 108 is preferably shielded from E-fields, but not from magnetic fields (H-fields). A pattern of electrically conductive material, such as a nickel-acrylic paint or the like, is applied to interior surfaces of the exoskeleton to define multiple distinct and discontinuous areas of conductive material on the exoskeleton. In other embodiments, both E-shielding and H-shielding may be similarly accomplished by coating the entire inner surface of the exoskeleton.

Hence, Winkler discloses a plastic exoskeleton containing a wire coil antenna assembly 108, but there is no coil and shield arrangement that is "located at a distance, in the order of centimetres, from an operator's hand, when the operator holds the transmission device during operation," as recited in claims 9 and 19. There is no discussion in Winkler about the distance between the coil and/or shield and the hand of

an operator because the programming head 100 is part of an implantable medical device that is not normally held during operation. Moreover, even if programming head 100 were held, the electrically conductive material, such as a nickel-acrylic paint or the like, is applied to interior surfaces of the exoskeleton, and thus, would not be "centimeters" from a holder's hand. And because there is no discussion in Winkler about the distance between the coil antenna and the plastic exoskeleton, there is no teaching of the coil being "located at a distance, in the order of centimetres, from an operator's hand." Finally, since claim 9 is dependent on claim 1 and claim 19 is dependent on claim 10, given the deficiencies in the teachings of Zarinetchi discussed above, the subject-matter of claims 9 and 19 is not obvious over a combination of Winkler and Zarinetchi.

In view of the foregoing, it is believed that all of the claims pending in the application, *i.e.*, claims 1 – 21, are now in condition for allowance, which action is earnestly solicited. If any issues remain in this application, the Examiner is urged to contact the undersigned at the telephone number listed below.

Respectfully submitted,
NIXON & VANDERHYE P.C.
By: Robert A. Molan

Robert A. Molan
Reg. No. 29,834

RAM:drt

901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

ATTACHMENT A

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Previously Presented) A transmission device for transmitting into a human's or animal's body, from outside of the human's or animal's body, an alternating magnetic field to a receiver, which is implantable in the human's or animal's body, to supply energy drawn from the alternating magnetic field to an energy consuming implant, which is implantable in the human's or animal's body, the transmission device comprising:

a coil for generating outside of the human's or animal's body the alternating magnetic field for supplying the energy to the implant,

the coil extending longitudinally between a front end to be directed towards the receiver and a rear end to be directed away from the receiver,

a shield for shielding an environment outside of the human's or animal's body from the alternating magnetic field generated by the coil by surrounding the coil, except at the front end of the coil so that the alternating magnetic field is transmitted towards the receiver when the front end of the coil is directed towards the receiver,

the shield including a magnetizable core extending inside of the coil and a magnetizable casing integrated with the core and surrounding the rear end of the coil and the circumference of the coil along at least a portion of the longitudinal extension of the coil.

2. (Previously Presented) The transmission device according to claim 1, wherein the magnetizable casing completely surrounds the coil, except for the front end of the coil.

3. (Previously Presented) The transmission device according to claim 2, wherein the core wholly extends along the longitudinal extension of the coil.

4. (Previously Presented) The transmission device according to claim 1, wherein the magnetizable casing surrounds the circumference of the coil along a portion of the longitudinal extension of the coil.

5. (Previously Presented) The transmission device according to claim 4, wherein the core and/or coil extends past the magnetizable casing along the longitudinal extension of the coil, as seen from the direction towards the front end of the coil.

6. (Previously Presented) The transmission device according to claim 1, wherein the magnetizable casing comprises a circular cylindrical wall and a circular gable wall joined to the cylindrical wall, the core extends centrally in the cylindrical wall from the gable wall, and the coil is applied on the core with the rear end of the coil facing the gable wall.

7. (Previously Presented) The transmission device according to claim 6, wherein the cylindrical wall includes cut-outs.

8. (Previously Presented) The transmission device according to claim 1, wherein the shield is made of ferrite.

9. (Previously Presented) The transmission device according to claim 1, further comprising a plastic box, in which the coil and shield are arranged such that they are located at a distance, in the order of centimeters, from an operator's hand, when the operator holds the transmission device during operation.

10. (Previously Presented) An apparatus for transferring wireless energy from outside a human's or animal's body into the human's or animal's body to an energy consuming medical device implantable in the human's or animal's body, the apparatus comprising:

a transmission device operable from outside the human's or animal's body for transmitting into the human's or animal's body an alternating magnetic field, and

a receiver implantable in the human's or animal's body for receiving and drawing energy from the alternating magnetic field to be supplied to the energy consuming implantable medical device,

the transmission device including:

at least one coil for generating outside of the human's or animal's body the alternating magnetic field for supplying energy to the medical device implantable in the human's or animal's body,

the coil extending longitudinally between a front end to be directed towards the receiver and a rear to be directed away from the receiver,

at least one shield for shielding an environment outside of the human's or animal's body from the alternating magnetic field generated by the coil by surrounding the coil, except at the front end of the coil, so that the alternating magnetic field is transmitted towards the receiver when the front end of the coil is directed towards the receiver,

the shield including a magnetizable core extending inside of the coil and a magnetizable casing integrated with the core and surrounding the rear end of the coil and the circumference of the coil along at least a portion of the longitudinal extension of the coil.

11. (Previously Presented) An apparatus for transferring wireless of energy from outside a human's or animal's body into the human's or animal's body to an energy consuming medical device implantable in the human's or animal's body, the apparatus comprising:

a transmission device operable from outside the human's or animal's body for transmitting into the human's or animal's body an alternating magnetic field, the transmission device comprising a first transmitter and a second transmitter, and

a receiver implantable in the human's or animal's body for receiving and drawing energy from the alternating magnetic field to be supplied to the energy consuming implantable medical device,

the first and second transmitters including:

first and second coils, respectively, for generating respective alternating magnetic fields in two different directions towards the receiver,

each of the first and second coils extending longitudinally between a front end of the respective coil to be directed towards the receiver and a rear end of the respective coil to be directed away from the receiver, and

first and second shields for shielding an environment outside of the human's or animal's body from the alternating magnetic fields by surrounding the respective coil, except at the front end of the respective coil, so that the alternating magnetic field is transmitted towards the receiver when the front end of the respective coil is directed towards the receiver,

each of the first and second shields including a magnetizable core extending inside of its respective coil and a magnetizable casing integrated with the core and surrounding the rear end and the circumference of its respective coil along at least a portion of the longitudinal extension of its respective coil.

12. (Previously Presented) The apparatus according to claim 10, wherein the magnetizable casing completely surrounds the coil except the front end thereof.

13. (Previously Presented) The apparatus according to claim 12, wherein the core wholly extends along the longitudinal extension of the coil.

14. (Previously Presented) The apparatus according to claim 10, wherein the magnetizable casing surrounds the circumference of the coil along a portion of the longitudinal extension of the coil.

15. (Previously Presented) The apparatus according to claim 14, wherein the core and/or coil extends past the magnetizable casing along the longitudinal extension of the coil, as seen from the direction towards the front end of the coil.

16. (Previously Presented) The apparatus according to claim 10, wherein the magnetizable casing comprises a circular cylindrical wall and a circular gable wall joined to the cylindrical wall, the core extends centrally in the cylindrical wall from the gable wall and the coil is applied on the core with the rear end of the coil facing the gable wall.

17. (Previously Presented) The apparatus according to claim 16, wherein the cylindrical wall includes cut-outs.

18. (Previously Presented) The apparatus according to claim 10, wherein the shield is made of ferrite.

19. (Previously Presented) The apparatus according to claim 10, further comprising a plastic box, in which the coil and shield are arranged such that they are located at a distance, in the order of centimeters, from an operator's hand, when the operator holds the transmission device during operation.

20. (Previously Presented) A method for transferring harmless wireless energy from outside a human's or animal's body into the human's or animal's body to an energy consuming medical device implantable in a human's or animal's body, the method comprising the steps of:

implanting in the human or animal a receiver capable of receiving and drawing energy from an alternating magnetic field to be supplied to the energy consuming medical device,

manually holding external to the body a transmission device capable of transmitting the alternating magnetic field, the transmission device including:

a coil for generating from outside of the human or animal the alternating magnetic field for supplying energy to the medical device implanted in the human or animal,

the coil extending longitudinally between a front end directed away from a hand holding the transmission device and a rear end facing the hand holding the transmission device, and

transmitting by means of the transmission device the alternating magnetic field to the implanted receiver, and

shielding by means of a shield the hand holding the transmission device from the alternating magnetic field generated by the coil by surrounding at least a portion of the coil, the shield including a magnetizable core extending inside of the coil of the transmission device and a magnetizable casing integrated with the core of the transmission device and surrounding the rear end of the coil and the circumference of the coil along at least a portion of the longitudinal extension of the coil.

21. (Previously Presented) A method for transferring harmless wireless energy from outside a human's or animal's body into the human's or animal's body to an energy consuming medical device implantable in the human's or animal's body, the method comprising the steps of:

implanting in the human's or animal's body a receiver capable of receiving and drawing energy from an alternating magnetic field to be supplied to the energy consuming medical device,

providing a transmission device external to the human's or animal's body that is capable of transmitting the alternating magnetic field, the transmission device including a coil extending longitudinally between a front end and a rear end,

positioning the transmission device relative to the body so that the front end of the coil is directed towards the receiver and the rear end of the coil is directed away from the receiver, and

transmitting to the implanted receiver by means of the transmission device the alternating magnetic field for supplying energy to the medical device implantable in the human's or animal's body, and

shielding by means of a shield an environment outside of the human's or animal's body from the alternating magnetic field generated by the coil by surrounding the coil, except at the front end of the coil, so that the alternating magnetic field is transmitted towards the receiver when the front end of the respective coil is directed towards the receiver,

the shield including a magnetizable core extending inside of the coil of the transmission device and a magnetizable casing integrated with the core of the transmission device and surrounding the rear end of the coil and the circumference of the coil along at least a portion of the longitudinal extension of the coil.